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The Fading Affect Bias:

Effects of Social Disclosure to an Interactive versus Non-Responsive Listener

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Abstract

The intensity of negative emotions associated with event memories fades to a greater extent over time than positive emotions (Fading Affect Bias or FAB). In this study, we examine how the presence and behaviour of a listener during social disclosure influences the FAB and the linguistic characteristics of event narratives. Participants recalled pleasant and unpleasant events and rated each event for its emotional intensity. Recalled events were then allocated to one of three experimental conditions: no disclosure, private verbal disclosure without a listener, or social disclosure to another participant whose behaviour was experimentally manipulated. Participants again rated the emotional intensity of the events immediately after these manipulations and after a one week delay. Verbal disclosure alone was not sufficient to enhance the FAB. However, social disclosure increased positive emotional intensity, regardless of the behaviour of the listener. Whilst talking to an interactive listener led unpleasant event memories to decrease in emotional intensity, talking to a non-responsive listener increased their negative emotional intensity. Further, listener behaviour influenced the extent of emotional expression in written event narratives. This study provides original evidence that listener behaviour during social disclosure is an important factor in the effects of social disclosure in the FAB.

Key terms: Autobiographical Memory, Fading Affect Bias, Emotional Intensity, Social Interaction, LIWC

The intensity of negative emotions associated with everyday unpleasant events often fades in memory, whilst positive emotions associated with everyday pleasant events remain relatively constant over time. This phenomenon is known as the fading affect bias or FAB (Walker, Skowronski & Thompson, 2003). The FAB is observed when participants rate the intensity of emotion felt at an event's occurrence compared to what they feel upon event recall. In most cases, the drop in emotional intensity is larger for unpleasant events than for pleasant. The fading affect bias is apparent as soon as 36 hours after events occur, and in some cases present after only 12 hours (Gibbons, Lee & Walker, 2011). The FAB has been observed after retention intervals of three months, one year, and four and a half years (Walker, Vogl & Thompson, 1997).

The FAB is a robust phenomenon and survives attempts to explain it as a methodological artefact. It appears regardless of whether a daily diary or retrospective recall method is used to obtain event memories and emotional intensity ratings (Ritchie, Skowronski, Hartnett et al., 2009; Walker et al., 1997). The FAB also appears irrespective of whether a between- or within-participants design is used, and regardless of whether participants report emotional intensity ratings at event occurrence or event recall first (Landau & Gunter, 2009). The FAB does not seem to be as a result of participants' beliefs in how emotions fade over time (Dwyer, Gibbons & Walker, 2004; Ritchie et al., 2009) or differing activation levels of emotions (Ritchie et al., 2009). Research has also confirmed the FAB cannot be attributed to differing event age or ease of recall for pleasant versus unpleasant events (Ritchie et al., 2009; Skowronski, Gibbons, Vogl et al., 2004; Walker et al., 1997). Importantly, studies also confirm that emotional intensity is usually equivalent for pleasant and unpleasant events at event occurrence, making the temporal locus of the FAB the emotional intensity felt at event recall (Ritchie et al., 2006; Skowronski et al., 2004; although see Gibbons, Lee & Walker, 2011).

Theoretical explanations have focussed on the emergence of the FAB as a consequence of emotion regulation processes operating on autobiographical memory over the lifespan (Walker & Skowronski, 2009). One such explanation is Taylor's (1991) mobilisation-minimisation hypothesis. This account suggests that upon encountering an unpleasant event, an individual's psychological, biological and social resources are mobilised to deal with the immediate consequences of the event.

Afterwards, in order to return to a state of normal functioning, the impact of the event is minimised. Thus, the negative emotions associated with unpleasant events are more likely to fade compared to the positive emotions associated with pleasant events. The FAB therefore contributes to a sense of positivity when remembering life events, which in turn can help individuals to regulate their emotions, strengthen communications with others and prepare for the future (Conway & Pleydell-Pearce, 2000; Sedikides, Skowronski & Gaertner, 2004).

Social disclosure versus private rehearsal and the FAB

One promising mechanism involved in the development of the FAB concerns the social disclosure of event memories (i.e., talking to other people about experienced events). Individuals, both male and female, and across different cultures report sharing their emotional experiences with others, often on the same day the event occurred (Rime, Mesquita, Philippot et al., 1991). Indeed, research has found that social disclosure is associated with an enhancement of the FAB (Ritchie et al., 2006; Skowronski et al., 2004; Walker et al., 2009). Skowronski et al (2004) used a multi-method approach to investigate the role of social disclosure in the FAB. Using participant self-reported retrospective estimates of social disclosure frequency, they found that high frequency of social disclosure is associated with increased fading of negative emotional intensity (Study 2), and high breadth of social disclosure (i.e., the number of different types of people an event had been disclosed to) was associated with decreased fading of positive emotional intensity (Study 3). Finally, Skowronski et al. (2004) used an experimental design to manipulate the frequency of social disclosure (Study 4). Participants provided emotional intensity ratings for pleasant and unpleasant events then socially disclosed these events to other participants either two times, three times, or not at all. Participants again provided emotional intensity ratings one week after the disclosures. Positive emotional intensity increased for pleasant events, and negative emotional intensity decreased for unpleasant events with rising frequency of disclosure, compared to before the disclosures. Thus, it appears that socially disclosing event memories has a beneficial effect on the emotional intensity of those memories.

Furthermore, the effects of social disclosure on the FAB seem to be unique and separate from those of private event rehearsal. When participants provide retrospective estimates of overall private rehearsal frequency or frequency of specific types of rehearsal (such as rehearsal to maintain event memory, or rehearsal to re-experience the emotion of an event), high private rehearsal frequency does not enhance the FAB in the same way as social disclosure (Ritchie et al., 2006; Skowronski et al., 2004; Walker et al., 2009). Only private rehearsals with the aim of reflecting on the event have been found to have similar effects upon emotional intensity to that of social disclosures (Ritchie et al., 2006) but this relationship has not been found consistently (Walker et al., 2009). Thus, previous research predicts a special role for social disclosure in the FAB, separate to that of event rehearsal.

However, there are still some ambiguities regarding the unique role of social disclosure in the FAB, and to what extent social disclosure effects can be accounted for by event rehearsal. Firstly, the majority of previous research into social disclosure and the FAB utilise correlational designs, with only one study attempting to provide a robust causal link between social disclosure and the FAB (Skowronski et al., 2004, Study 4). Secondly, although Skowronski et al. (2004) made important inroads towards identifying social disclosure as a plausible mechanism underlying the FAB, it is still possible the effects of increasing social disclosure frequency are partially or wholly due to increased event rehearsal. In Skowronski et al. (2004)'s experimental study, two and three social disclosures were compared to no disclosure. However, with increasing social disclosure frequency, the extent of event rehearsal in terms of repeated verbalisation of the event memory is also increased. Thus, without a comparison of a single social disclosure to no disclosure, it is not yet possible to unequivocally rule out the possibility that social disclosure effects are driven by the mechanism of event rehearsal. As a result, the picture is still unclear as to the contributing role of private rehearsal in the effects of social disclosure on the FAB. Finally, the precise mechanisms that bring about the effects of social disclosure remain uncertain and untested in the literature. Even if we are able to rule out event rehearsal as a contributing factor, there are still a wide variety of factors that could be involved in the effects of social disclosure on the FAB. Some researchers have suggested there are a variety of conversational norms, social and cognitive factors that influence the content of socially

disclosed autobiographical memories (Skowronski & Walker, 2004). However, such factors have yet to be directly manipulated and examined within the context of the FAB. We describe some potential factors below and discuss how each could contribute to the effects of social disclosure in the FAB.

Verbal emotional disclosure

Firstly, there is evidence that verbal disclosure of emotional memories or feelings is associated with a reduction in subjective negative emotion. The written emotional disclosure paradigm (Pennebaker & Beall, 1986) instructs participants to repeatedly write about an unpleasant emotional event or topic. Compared to writing about a neutral topic for the same length of time, written emotional disclosure has been found to improve reported physical health and psychological wellbeing (Frattaroli, 2006). Written emotional disclosure is proposed to have these beneficial effects through the conversion of the event memory into a linguistic structure suitable for narration, which in itself promotes understanding of the event and reduction of its associated negative emotion (Pennebaker, Mayne & Francis, 1997). Creating a verbal narrative of an event memory during social disclosure could act in much the same way. Creating and verbalising a linguistic narrative of an event could help to organise events and embed them into a personal life story (Pasupathi, 2001) or encourage emotional processing of the event and its meaning (Pennebaker, 1993). Indeed, vocal emotional disclosure of traumatic events is reported to have similar beneficial effects upon subjective negative emotion as written emotional disclosure (Murray & Segal, 1994). Therefore, it is possible that verbalisation of the event memory is all that is necessary to enhance the FAB and this act alone is responsible for the beneficial effects of social disclosure. If this is the case, other social factors, such as the presence and behaviour of a listener during social disclosure, may not be important.

The presence and behaviour of a listener

Social disclosure of event memories usually takes place within the everyday context of having conversations with others (Rime, Mesquita et al., 1991), and so the presence and behaviour of a listener and speaker-listener interactions could be one of the mechanisms involved in the effects of

social disclosure in the FAB. The listener could indirectly influence the speaker's feelings about the disclosed event by influencing memory for the event including its associated emotional intensity. Alternatively, the types of verbal responses, emotional support and validation of the speaker's emotions offered by a listener could be important in helping to retain positive emotions and leading negative emotional intensity to fade.

Firstly, the mere presence of a listener could influence the content of the narrative created by the speaker during social disclosure, which could then impact the speaker's memory for the event. This could act via the 'audience tuning' effect, which describes how the presence of a listener can encourage the speaker to describe the event in ways that ensure the listener's understanding (Krauss & Fussell, 1991). After tuning their narrative for the listener, the speaker's memory for the topic they described can be biased in line with how they had communicated it (Echterhoff, Higgins & Groll, 2005). Thus, if a speaker describes an unpleasant event to a listener in a way which minimises its negative emotional aspects, the content of the speaker's memory may be biased in line with this narrative and thus negative emotional intensity associated with the disclosed event decreases (i.e., Higgins & Rholes, 1978). The responsiveness of the listener during social disclosure could also impact on the type of information included by the speaker in their narrative. Kraut, Lewis and Swezey (1982) asked speakers to watch a film and summarised it to listeners who either sat and listened quietly, or provided feedback on the speaker's narrative. When listeners provided feedback, speakers changed their narrative in response; speakers elaborated their narrative to answer questions asked by the listener. Further, disclosing an experience to a distracted, as opposed to an attentive listener has been associated with the speaker creating narratives deficient in emotional and psychological aspects of the experience, which in itself can influence later memory accuracy for the original experience (Pasupathi & Hoyt, 2010). Thus, the presence and responsiveness of a listener during social disclosure can influence the content of the verbal narrative created by the speaker. This may impact on the speaker's memory for the original event, and by extension, its associated emotions.

Instead, the types of verbal responses offered by a listener during social disclosure could directly influence the speaker's feelings about the disclosed event. Where listener responses are judged by the

speaker to be agreeable (such as asking questions, providing feedback, and expressing agreement with the speaker's version of events), this is associated with the speaker feeling comforted and understood (Zech & Rime, 2005) and a reduction in negative emotion from event to retelling (Pasupathi, 2003). People rate expressions of emotional support from listeners and specifically expressions of love, concern and understanding as helpful in emotional recovery from unpleasant events (Lehman & Hemphill, 1990). Accordingly, a listener providing responses that are viewed by the speaker as emotionally supportive could be important in enabling the speaker to regulate the emotions associated with the disclosed event and enhancing the FAB.

There is indeed evidence that listener feedback can influence the way speakers feel about disclosed events, through validating or rejecting the speaker's emotions. Harris, Barnier, Sutton and Keil (2010) found that participants who discussed their emotional reactions to a public event in a group reported feeling less shocked and less emotional afterwards compared to before the discussion, and compared to participants who did not engage in group discussion. Examination of the group transcripts revealed that participants engaged in a process of negotiation as to how to respond to the event. Specifically, opinion that it was inappropriate to respond in an emotional way were voiced, validated, and accepted and opposite opinion silenced, invalidated, and rejected. Thus, the responses of other people in the group influenced the extent to which individual participants related emotionally to the event during the discussion and within subsequent reports. In summary, there is an array of research which suggests the way a listener responds and the kind of verbal feedback they provide could be an important factor in the effects of social disclosure in the fading affect bias.

Linguistic indicators of the effects of social disclosure

Studies into the fading affect bias often obtain written event descriptions from participants along with ratings of positive and negative emotional intensity (i.e., Gibbons et al., 2011; Ritchie & Skowronski, 2008; Skowronski et al., 2004). However, research within the FAB literature has yet to examine the linguistic characteristics of such event descriptions. Utilising linguistic analysis to examine the content of written event descriptions provided by participants could provide a window into the means by which social disclosure influences the emotional intensity of disclosed events. Linguistic analysis

approaches (looking at the types and frequency of words in narratives) assume that the types and frequencies of words used by individuals in either verbal or written expression are representative of the concepts the individual wishes to express, and can be used as a method of exploring an individual's inner thoughts and feelings (Tausczik & Pennebaker, 2010). Studies using linguistic analysis show the types and frequencies of words used by individuals in everyday and formal situations are reliably linked to a variety of psychological correlates (Pennebaker, Mehl & Niederhoffer, 2003).

There is evidence that linguistic characteristics of written descriptions of socially disclosed events differ from those of non-socially disclosed events: socially disclosed events are described with words which indicate distance (both from the self and temporally), are more detailed and emotionally positive compared to non-socially disclosed events (Pasupathi, 2007). Pasupathi (2007) proposes that the goals of the speaker (i.e., to share information, or to seek meaning) combined with the needs of the listener (i.e., to understand the order of events in the story) encourages individuals to describe events in a more objective (and therefore distanced), ordered and positive way during the social disclosure, and these effects are then evident in subsequent memory for the socially disclosed event. If this approach is related to the effects of social disclosure on the FAB, the effects of socially disclosing events could result in participants describing the event in a particular way during the social disclosure. These effects could then potentially be evident in the linguistic characteristics of subsequent written event descriptions, and be indicative of changes to event memory, which underlie the effects of social disclosure upon emotional intensity.

Alternatively, changes in linguistic characteristics of event descriptions after social disclosure could be representative of emotional and cognitive processing mechanisms associated with changes in emotional intensity. Where written emotional disclosure results in improvements to physical and psychological health, this is associated with linguistic indicators of increased emotional expression (positive and negative emotion terms) and cognitive processing (causal and insight terms) in narratives created by participants (Hamilton-West & Quine, 2007; Pennebaker & Francis, 1996; Schwartz & Drotar, 2004). Such increases in emotion and cognitive terms in narratives created during

emotional writing studies are interpreted as representing emotional and cognitive processing mechanisms, which operate during the writing process and underlie the beneficial effects of emotional writing on health. Thus, findings from the written emotional disclosure literature would suggest that the beneficial effects of social disclosure upon the FAB could potentially be associated with increased indications of emotional expression and cognitive processing in written event descriptions. If this is the case, this would suggest that social disclosure encourages participants to process the events emotionally and cognitively and such processing may contribute to the effects of social disclosure on the FAB.

Overview and aims of present research

The present research has three main aims. Firstly, we aim to address the ambiguity regarding the contributing role of event rehearsal in the effects of social disclosure on the FAB by experimentally manipulating private rehearsal and social disclosure and examining the resultant effects upon emotional intensity. Secondly, we aim to examine the importance of listener presence and verbal responses on the FAB, by manipulating the presence and responsiveness of the listener during social disclosure. Finally, we aim to explore potential mechanisms underlying the effects of social disclosure on the FAB, by examining participant event narratives for evidence that may be indicative of changes to event memory or enhanced emotional processing after social disclosure.

We introduce a novel experimental paradigm in which type of disclosure, listener presence, and listener behaviour during social disclosure are manipulated. Participants firstly recall three pleasant and three unpleasant event memories, write a description of each event, and rate each event for emotional intensity at event occurrence and recall. These emotional intensity ratings are used to calculate the pre-existing, baseline level of the fading affect bias in the sample. Next, in a laboratory session, each of these memories is subjected to a different type of disclosure: no disclosure (control), private verbal disclosure (without a listener) and social disclosure (to a listener). Within the social disclosure condition is nested a between-subjects factor of listener behaviour: feedback vs. no feedback. Importantly, the private verbal disclosure and social disclosure conditions both involve only a single verbalisation of the event memory narrative, thus keeping the extent of event rehearsal

involved as similar as possible between the two conditions. This experimental design should therefore enable robust conclusions to be drawn regarding the relative contributions of private rehearsal versus listener presence and behaviour in the effects of social disclosure in the fading affect bias. We will take a second event description and measure of emotional intensity immediately after the type of disclosure and listener behaviour manipulations, which will illustrate if the effects of disclosure are immediately detectable, or take time to be effective. One week later participants again write an event description and provide emotional intensity ratings, which will determine if the effects of social disclosure last.

Of primary interest are the effects of type of disclosure and listener behaviour upon the emotional intensity of the disclosed events. We would predict that private verbal disclosure enhances the FAB compared to no disclosure, owing to the beneficial effects of verbal emotional disclosure, or the mere act of event rehearsal. Alternatively, if the presence of a listener during social disclosure is indeed a vital component, we might expect private verbal disclosure to have no significant effects upon emotional intensity in comparison to no disclosure. Previous research into social disclosure and the FAB (Skowronski et al., 2004) and research into the audience tuning effect (Echterhoff, Higgins & Groll, 2005) would predict that social disclosure to a listener should enhance the FAB to a greater extent compared to both no disclosure and private verbal disclosure. We also predict social disclosure with feedback will enhance the FAB to a greater extent compared to no disclosure, and compared to social disclosure without feedback, due to the variety of ways in which listener verbal responses can impact on the speaker's memory and feelings about the disclosed event. We also examine the effects of type of disclosure and listener behaviour upon the linguistic characteristics of the written event descriptions provided by participants. We would predict that descriptions of socially disclosed events would show changes in the number of linguistic indicators relating to distance from self and temporal distance, compared to descriptions of events that were not disclosed (as seen in Pasupathi, 2007). Moreover, findings from the written emotional disclosure literature suggest we might see the beneficial effects of social disclosure reflected in changes in the numbers of linguistic indicators relating to emotional and cognitive processing in descriptions of socially disclosed compared to not

disclosed events.

METHOD

Participants

One hundred and seventy-four participants (144 female, 30 male; mean age 22.5 years, *S. D.* = 5.7 years) recalled memories and provided emotional intensity ratings to provide a baseline level of FAB. Two days later, 140 of these participants (117 females, 23 males; mean age 22.5 years, *S. D.* = 5.6 years) went on to experience the type of disclosure and listener behaviour manipulations in the laboratory (approximately 19% of participants dropped out of the study between baseline and the laboratory session). Seventy participants (35 dyads) were allocated to the *feedback* group and 70 participants (35 dyads) to the *no-feedback* group. These participants provided emotional intensity ratings immediately post manipulation. One week later 63 participants in the *feedback* group and 62 in the *no-feedback* group provided additional emotional intensity ratings (dropout rate between the laboratory session and measures taken one week later was approximately 11%). Participants received course credit or a small monetary reward for completion of the study.

Design

A 2 (event valence: pleasant vs. unpleasant) x 3 (type of disclosure: no disclosure vs. private verbal disclosure vs. social disclosure) x 2 (listener behaviour: feedback vs. no-feedback) mixed design was utilised. The first two factors varied within subject. The third factor, listener behaviour, varied between-subjects, and was nested within the social disclosure condition. Thus, half the dyads in this condition were instructed to provide verbal feedback (35 dyads) and half were instructed not to provide verbal feedback (35 dyads) in response to the social disclosure. The dependent measures used are: 1) ratings of emotional intensity at event occurrence and recall provided by participants at baseline, immediately post manipulations and one week post manipulations; and 2) a set of linguistic indicators for each event description provided by participants at baseline, immediately post manipulations and one week post manipulations.

Procedure and Measures

Baseline event memory retrieval

Participants completed the baseline event memory measures at a convenient location using an online questionnaire system. They were instructed to recall three pleasant and three unpleasant events that they had experienced within the last 12 months, but not within the last seven days (c.f. Skowronski et al., 2004). Previous research has established that event age is not a significant predictor of the fading affect bias (Gibbons et al., 2011; Ritchie et al., 2009; Walker et al., 2003). Thus, although participants were instructed to recall events within a specific time period, the exact date the event originally occurred was not requested. For each event, participants were asked to provide a title, which acted as a memory cue later on in the study, and to write a description of the event. Instructions advised participants to *"describe the event in your own words, in as much detail as you can"*. There was no space limit for the written event description. Participants were also asked to indicate how positive (or negative, for the unpleasant events) he or she felt about the event both when it happened (upon event occurrence) and as they were recalling it now (upon event recall). Ratings were made on a unipolar rating scale from 1, representing not at all emotionally intense, to 7 representing very emotionally intense (i.e., Ritchie & Skowronski, 2008; Ritchie et al., 2006). The order of initial event memory retrieval was counterbalanced, with half the participants recalling pleasant event memories before unpleasant, and vice versa.

Laboratory session: Type of disclosure and listener behaviour manipulations

Two days after baseline event memory retrieval, participants were randomly allocated into dyads and called into the laboratory for the type of disclosure and listener behaviour manipulations. Participants were unknown to each other prior to the experiment. One pleasant and one unpleasant event memory previously recalled by participants were not privately or socially disclosed, and acted as a no disclosure control condition. For the private verbal disclosure condition, each participant was seated alone in an experimental cubicle. They were given seven minutes to privately verbally disclose one pleasant and one unpleasant event and were instructed to practice telling the story of each event, out loud, as if talking to someone. For the social disclosure condition, dyads were sat together in the

same experimental cubicle where participants proceeded to take turns in disclosing one pleasant and one unpleasant event each. The directions given to participants in this condition differed according to feedback type (the listener behaviour manipulation). For dyads in the *feedback* group, they were advised they could chat about the events whilst socially disclosing them in the same way they normally would when talking to a friend. They were told to feel free to ask questions and offer each other comments or feedback during the disclosures. Dyads in the *no-feedback* group were informed it was important they did not interrupt the discloser whilst they were talking. They were told to listen quietly, and not to talk or ask questions during the social disclosures. Fifteen minutes were allowed for this condition to enable each participant to speak for approximately seven minutes each. A Dictaphone was used to record all private verbal and social disclosures. A manipulation check carried out on a selection (25%) of the private verbal disclosure and social disclosure audio recordings confirmed participants followed the task instructions in the laboratory correctly.

Type of disclosure order in the laboratory session was counterbalanced, with half the participants completing the social disclosure condition before private verbal disclosure and vice versa. The order in which pleasant and unpleasant events were disclosed was also counterbalanced across both the private verbal disclosure condition and the social disclosure condition.

Immediately after experiencing both the private verbal disclosure and social disclosure conditions, each participant was seated alone in an experimental cubicle and provided with the six event titles they had previously supplied. These acted as memory cues and participants re-rated each event for the intensity of emotion felt upon recall. Participants were also asked to write a description of the event. The instructions given for the event description were similar to those given at baseline, with a slight amendment to mitigate the potential that participants may withhold details for fear they are repeating their earlier description: "*It doesn't matter if you feel you are repeating yourself, please just write a description of the event in your own words, in as much detail as you can."* There was no space limit for the event description. One week later participants again wrote a description of the event (using the same instructions given immediately post manipulation) and re-rated each event for the intensity of

emotion felt upon recall, from a convenient location using the online questionnaire system.

RESULTS

Statistical analysis

All analyses were conducted using a multilevel modelling approach, which is advocated wherever a hierarchical dataset is used, as an alternative to classical data analysis approaches such as ANOVA or multiple regression (Goldstein, 2003). An assumption of these traditional types of approaches is that each unit of analysis is an independent observation. However, the dataset used here is hierarchical, as the six event memories retrieved by each participant are unique to, and thus clustered within, that participant. Participants are further nested into dyads. The consequences of ignoring such clustering in statistical analysis include overestimation of the effects of explanatory variables upon the outcome variable of interest (Wright, 1998). The analysis of data using multilevel modelling proceeds in a similar manner as with multiple regression techniques, but with the advantage of accounting for any clustering in the data thus ensuring the effects of explanatory variables on the outcome variable of interest are accurately estimated, along with precise standard errors and statistical significance values (Berkhof & Kampen, 2004). Multilevel modelling has previously been successfully used to analyse clustered memory data collected using participants in dyads (Ford, Addis & Giovanello, 2012; Schwartz & Wright, 2012; Skagerberg & Wright, 2008; Skagerberg & Wright, 2009). All modelling was performed using MLwiN (Rasbash, Browne, Healy et al., 2010).

A separate model is constructed to address the specific research question of interest within each part of the analysis. For each model that is constructed, the outcome variable is predicted from main effects and interactions between the explanatory variables of event valence (pleasant vs. unpleasant), type of disclosure (no disclosure vs. private verbal disclosure vs. social disclosure) and listener behaviour (feedback vs. no feedback). The first step is to examine if the main effect or interaction of interest makes a significant improvement to model fit. In MLwiN, this is indicated by a likelihood ratio test (Rasbash et al., 2009). The likelihood ratio statistic is compared to a x^2 distribution to obtain a p value. When a main effect or interaction is found to be a significant improvement to model fit,

Wald tests are used to examine the effects further, in terms of conducting comparisons and investigating interactions. The Wald statistic is compared to a x^2 distribution to obtain a p value.

Fading Affect Bias prior to Type of Disclosure and Listener Behaviour manipulations

Initially, the baseline, pre-existing level of the fading affect bias (FAB) in the sample was established, using the ratings of emotional intensity at event occurrence and recall provided by participants at baseline (which were both rated on a scale from 1, not at all intense, to 7, very intense). The ratings for emotional intensity at event occurrence were subtracted from ratings for emotional intensity at event recall, to give a *fading affect* score for each event memory (i.e., Skowronski et al., 2004). Here, Positive values indicate the intensity of emotion increased from event occurrence to recall, whereas negative values indicate emotion decreased in intensity from event occurrence to recall. The size of the value indicates the extent of change, with greater values indicating greater change in emotional intensity between event occurrence and recall. The fading affect score for each event memory is predicted from event valence (pleasant vs. unpleasant). The fading affect bias is observed; unpleasant events decreased in emotional intensity between event occurrence and recall to a significantly greater extent (M = -1.57) compared to pleasant events (M = -.68; x^2 (1) = 112, p<.001).

The locus of the fading affect bias is typically observed in the ratings made at event recall rather than those made for event occurrence; pleasant and unpleasant events are typically rated as similar in intensity at event occurrence, but unpleasant events are rated as significantly less intense at recall than pleasant events, which retain more of their emotional intensity. The locus of the fading affect bias in the present data was examined by analysing separately emotional intensity ratings attributed to event occurrence and event recall. Firstly, emotional intensity at event occurrence was predicted from event valence (pleasant vs. unpleasant). In this case unpleasant events were rated as being slightly less intense (M = 6.03) than pleasant events (M = 6.3; x^2 (1) = 32, p<.001) at event occurrence. However, this is not an unusual finding in the FAB literature (Gibbons et al., 2011; Ritchie et al., 2009). In fact, the initial emotional intensity difference demonstrates the robustness of the FAB (as measured by mean fading affect scores): even though pleasant events had more room to fade in emotional intensity between event occurrence and recall, unpleasant events still faded in intensity to a significantly

greater extent. Critically, event valence is a significant predictor of emotional intensity ratings at event recall, and in the predicted direction: ratings of intensity for unpleasant events are lower (M = 4.4) than those given for pleasant events (M = 5.7; x^2 (1) = 170, p<.001) and the difference between emotional intensity ratings for pleasant and unpleasant events is of a far greater magnitude at the time of recall (d = 1.08), than at the time of occurrence (d = .5). Thus, the locus of the fading affect bias is in the lower ratings of emotional intensity for unpleasant versus pleasant events at the time of recall.

The Effects of Type of Disclosure and Listener Behaviour upon Emotional Intensity Ratings

A new measure was calculated to indicate the degree to which ratings of emotional intensity at event recall had changed between baseline and post manipulations, called *Mean change in emotional intensity* (c.f. Skowronski et al., 2004). The ratings of emotional intensity at recall given at baseline were subtracted from the ratings of emotional intensity at recall given immediately post manipulation. A positive value signifies emotional intensity at recall has increased (become more intense), whereas a negative value shows emotional intensity has decreased (become less intense). This process was repeated for the ratings for emotional intensity at recall given one week post manipulations. The strategy was to predict mean change in emotional intensity scores immediately post manipulation and one week post manipulation for each event memory, from main effects and interactions between the within-subjects variables of event valence (pleasant vs. unpleasant) and type of disclosure (no disclosure vs. private verbal disclosure vs. social disclosure), and the between-subjects factor of listener behaviour (feedback vs. no feedback). For clarity we report here only significant main effects or interactions.

Note, including the order in which participants undertook the disclosure conditions as an additional explanatory variable (i.e., whether the social disclosure condition was performed before or following the private verbal disclosure condition) was not found to change the interpretation of the results. For clarity the analyses described below exclude this explanatory variable. In addition, as the between-subjects factor of listener behaviour (feedback vs. no-feedback) is nested within the social disclosure condition we may not expect to find any effects of listener behaviour upon ratings made for the no disclosure and private verbal disclosure events, as these events were not directly subject to the

listener behaviour manipulation. However, ratings for events in each disclosure condition were taken after each participant had been exposed to the listener behaviour manipulation. Therefore carry over effects from the social disclosure condition to ratings made for the no disclosure and private verbal disclosure events may be evident (if, for example, receiving feedback or not from a listener during social disclosure induced a global change in mood which could influence all subsequent ratings made). Thus, mean change in emotional intensity scores for each type of disclosure condition are presented for feedback and no feedback groups separately.

Emotional intensity immediately post manipulation

There was a significant three way interaction between event valence, type of disclosure and listener behaviour (x^2 (12) = 23, p = .03). Figure 1 presents mean change in emotional intensity scores for pleasant and unpleasant events immediately post manipulation, by type of disclosure and listener behaviour. Follow up analyses were carried out for pleasant versus unpleasant events separately.

Pleasant events: Emotional intensity increases after social disclosure, for both feedback and no-feedback groups

There was a significant effect of type of disclosure (x^2 (2) = 9, p = .01). Collapsing across feedback and no-feedback groups, there were no significant differences between no disclosure and private verbal disclosure events (x^2 (1) = .6, n.s.). However, as depicted in Figure 1 (a), for both feedback and no-feedback groups socially disclosed pleasant events increased in emotional intensity compared to no disclosure (x^2 (1) = 4, p = .04) and private verbal disclosure events (x^2 (1) = 3.7, p = .05).

Unpleasant events: Emotional intensity decreases after social disclosure with feedback, but increases after social disclosure without feedback

There was a significant interaction between type of disclosure and listener behaviour (x^2 (6) = 17, p = .008). Follow-up comparisons revealed that there were no differences between the no disclosure and private verbal disclosure events within either the feedback group (x^2 (1) = .05, n.s.) or the no feedback group (x^2 (1) = .7, n.s.). However, Figure 1 (b) illustrates that unpleasant events socially disclosed

with feedback decreased in emotional intensity compared to both the no disclosure events (x^2 (1) = 3.9, p = .04) and private verbal disclosure events (x^2 (1) = 4.9, p = .02). In contrast, unpleasant events socially disclosed without feedback increased in emotional intensity compared to both the no disclosure events (x^2 (1) = 7.6, p = .005) and private verbal disclosure events (x^2 (1) = 3.7, p = .05).

Emotional intensity one week post manipulation

The interaction between event valence, type of disclosure, and listener behaviour was marginally significant (x^2 (12) = 20, p = .06). Figure 2 presents mean change in emotional intensity scores for pleasant and unpleasant events one week post manipulation, by type of disclosure and listener behaviour. Analyses were conducted on pleasant and unpleasant events separately.

Pleasant events: Emotional intensity increases after social disclosure, but only if feedback is received

There was an interaction between type of disclosure and listener behaviour (x^2 (6) = 13, p = .04). Follow-up comparisons revealed that for the feedback group, there were no significant differences between the no disclosure and private verbal disclosure events (x^2 (1) = .5, n.s.). However, pleasant events socially disclosed with feedback increased in emotional intensity compared to both no disclosure events (x^2 (1) = 4.6, p = .03) and private disclosure events (x^2 (1) = 5.7, p = .02). There was no effect of type of disclosure for the no feedback group (x^2 (2) = 2, n.s.). This indicates that one week later, the effects of social disclosure remain evident, but only if feedback was received (Figure 2a).

Unpleasant events: No significant effects of type of disclosure or listener behaviour

There were no significant effects of type of disclosure (x^2 (2) = 1, n.s.) or listener behaviour (x^2 (1) = 1, n.s.) and no significant interaction (x^2 (6) = 4, n.s.). The means in Figure 2 (b) show that no disclosure events have now decreased in emotional intensity to a similar extent as events socially disclosed with feedback. Events socially disclosed without feedback have begun to decrease in intensity, compared to immediately post manipulation where they increased in intensity (see Figure 1 b). The decrease in intensity is still to a lesser extent compared to the events socially disclosed with feedback and this difference is marginally significant (x^2 (1) = 3.3, p = .06).

Linguistic Indicators of the Effects of Type of Disclosure and Listener Behaviour

Each event description provided by participants at each stage of the study (baseline, immediately post manipulations and one week post manipulations) was processed by the Linguistic Inquiry and Word Count program (LIWC: Pennebaker, Booth & Francis, 2007). The LIWC software has a dictionary of approximately 4,500 words in 80 categories which have been extensively developed and validated (Pennebaker, Chung, Ireland et al., 2007). LIWC processes a text file word by word, comparing each word to the dictionary and providing a count of the words in the file which match each category in the dictionary. Sums of words in each category are presented as percentage of total words in the file to correct for differences in text length between text files (Pennebaker, Chung et al., 2007). The linguistic indicators from the LIWC dictionary used in the analyses were as follows (with examples of words in each category): **I** (*I, me, mine*); **we** (*we, us, ou*r); **he/she** (*she, her, him*); **they** (*they, their*); **past** (*went, ran, had*); **present** (*is, does*); **positive emotion** (*love, nice*); **negative emotion** (*hurt, nasty*); **insight** (*think, know*); **causality** (*because, effect*); **discrepancies** (*should, could*); **tentativeness** (*maybe, guess*); **certainty** (*always, never*). These linguistic indicators were chosen for their relevance to the effects of social disclosure on the linguistic characteristics of event narratives, and linguistic indicators of the effects of emotional disclosure. A word count was also included to examine if description length changed significantly after the experimental manipulations.

A new measure was calculated to indicate the degree to which the percentage of each linguistic indicator in event descriptions had changed between baseline and post manipulations, called *Linguistic change.* For each linguistic indicator, the percentage of the indicator in event descriptions written at baseline was subtracted from the percentage of the indicator in descriptions written immediately post manipulation. A positive value signifies the percentage of the linguistic indicator in the event description has increased between baseline and immediately post manipulation, whereas a negative value shows the percentage of the indicator in the event description has decreased. This process was repeated for the linguistic indicators in event descriptions written one week post manipulation. Thus, each event memory had an associated set of *linguistic change* variables, representing the extent to which the percentage of each linguistic indicator had changed in event

descriptions between baseline and post manipulation and between baseline and one week post manipulations.

Analyses were firstly undertaken on the data immediately post manipulation compared to baseline. Separate models were constructed for each linguistic indicator. For each model constructed, linguistic change for that indicator is used as the outcome variable, which is predicted from main effects and interactions between the within-subjects variables of event valence (pleasant vs. unpleasant) and type of disclosure (no disclosure vs. private verbal disclosure vs. social disclosure), and the between-subjects factor of listener behaviour (feedback vs. no feedback). This process is then repeated for the data one-week post manipulation compared to baseline. To adjust for the number of separate regressions performed on the data (i.e., to avoid Type 1, false positive, errors), in all analyses a conservative alpha of $p<.01$ was adopted (Mundfrom, Perrett, Schaffer et al., 2006). Note, there were no significant main effects of event valence, type of disclosure, listener behaviour and no interactions for the length of description or for the following linguistic indicators, either immediately post manipulation or one week post manipulations: I, we, he/she, they, past, present, insight, causality, discrepancies, tentativeness, certainty. Thus, for clarity we report here only significant main effects and interactions that relate to analyses using positive and negative emotion terms.

Linguistic Change Immediately Post Manipulation: Positive Emotion Terms

Using linguistic change for positive emotion terms as the outcome variable, there was a significant three way interaction between event valence, type of disclosure and listener behaviour (x^2 (12) = 25, p = .02). Analyses were conducted for pleasant and unpleasant event descriptions separately.

Pleasant Events: Social disclosure with feedback increases linguistic indicators of positive emotion

There was a significant interaction between type of disclosure and listener behaviour (x^2 (6) = 16.0, p = .01). There were no significant differences between no disclosure and private verbal disclosure events in either the feedback group (x^2 (1) = 1.0, n.s.) or no feedback group (x^2 (1) = 0.5, n.s.). However, Figure 3a illustrates that descriptions of pleasant events which were socially disclosed with feedback showed an increase in the percentage of positive emotion terms compared to the no disclosure (x^2 (1) = 6.0, p = .01) and private verbal disclosure event descriptions (x^2 (1) = 6.5, p = .01).

In contrast, descriptions of pleasant events socially disclosed without feedback showed a decrease in positive emotion terms compared to no disclosure (x^2 (1) = 6, p = .01) and private verbal disclosure event descriptions (x^2 (1) = 6, p = .01).

Unpleasant Events: No effects for positive emotion terms

There were no significant effects of type of disclosure (x^2 (2) = 1, n.s.) or listener behaviour (x^2 (1) = 1, n.s.) and no significant interaction (x^2 (6) = 2, n.s.), suggesting the experimental manipulations did not influence the percentage of positive emotion terms within unpleasant event descriptions (Figure 3b).

Linguistic Change Immediately Post Manipulation: Negative Emotion Terms

Using linguistic change for negative emotion terms as the outcome variable, there was a significant three way interaction between event valence, type of disclosure and listener behaviour (x^2 (12) = 23, p = .03). Analyses were conducted for pleasant and unpleasant event descriptions separately.

Pleasant Events: No effects for negative emotion terms

There were no significant effects of type of disclosure (x^2 (2) = 1.5, n.s.) or listener behaviour (x^2 (1) = 1, n.s.) and no significant interaction (x^2 (6) = 1, n.s.), suggesting the experimental manipulations did not influence the percentage of negative emotion terms within pleasant event descriptions (Figure 4a).

Unpleasant Events: Social disclosure with feedback increases linguistic indicators of negative emotion

There was a significant interaction between type of disclosure and listener behaviour (x^2 (6) = 16.0, p = .01). There were no significant differences in percentage of negative emotion terms in unpleasant event descriptions between no disclosure and private verbal disclosure events in either the feedback group (x^2 (1) = 0.5, n.s.) or no feedback group (x^2 (1) = 2.5, n.s.). With respect to social disclosure, Figure 4b demonstrates that descriptions of unpleasant events socially disclosed with feedback showed an increase in negative emotion terms compared to the no disclosure (x^2 (1) = 7.0, p = .008) and private verbal disclosure event descriptions (x^2 (1) = 6.5, p = .01). Descriptions of unpleasant events socially disclosed without feedback showed a decrease in negative emotion terms compared to

no disclosure (x^2 (1) = 6.0, p = .01) and private verbal disclosure event descriptions (x^2 (1) = 8.0, p = .004).

Linguistic Change One Week Post Manipulation

Analyses indicated no significant main effects or interactions for either positive emotion terms or negative emotion terms one-week post manipulation, so for clarity these results are not discussed further.

DISCUSSION

This study yielded three main findings. Firstly, we found no significant effects of private verbal disclosure upon pleasant or unpleasant emotional intensity in comparison to no disclosure, either immediately or at the one week delay In contrast, the effects of social disclosure were evident both immediately and after a one week delay. Importantly, the private verbal disclosure and social disclosure conditions were similar in the extent of event rehearsal involved, as both conditions involved a single verbalisation of an event memory narrative. Moreover, the instructions given for the private verbal disclosure task encouraged participants to have a similar goal as for social disclosure, as the private verbal disclosure task involved telling the story of the event, as if telling someone else. This suggests that creating and verbalising the event narrative in this particular way was not sufficient in itself to influence emotional intensity. Findings from the written emotional disclosure literature yielded predictions that the beneficial effects of social disclosure could potentially be attributed to the translation of the event memory into a coherent structure suitable for narration (Pennebaker, 1997). However, the current research does not support this as an account for the effects of social disclosure in enhancing the FAB. Rather, the second major finding in this study revealed that verbal feedback provided by a listener during social disclosure is important in the enhancement of the FAB. Compared to non-disclosed events, socially disclosing pleasant event memories made the events feel more intensely positive, regardless of the behaviour of the listener. However, such increases in positive emotional intensity were maintained one week later only if feedback from the listener was received. In comparison, talking to an interactive listener, one who provided verbal feedback, led

unpleasant event memories to fade in emotional intensity, but talking to a non-responsive listener increased their emotional intensity. One week later, unpleasant events socially disclosed without feedback had not faded in emotional intensity to the same extent as if feedback had been received. Thus, our experimental results indicate a causal link between social disclosure and the FAB, and that the presence and behaviour of the listener during social disclosure have a vital role to play. Finally, linguistic analysis of written event descriptions revealed both pleasant and unpleasant event descriptions exhibited an immediate increase in emotion terms after social disclosure, but only if the listener provided feedback. Listener behaviour during social disclosure therefore seems to be involved in influencing the extent of emotional expression in subsequent event descriptions written immediately after social disclosure.

Exploring mechanisms underlying the effects of social disclosure and listener behaviour

The next step is to consider the mechanisms by which listener behaviour during social disclosure influences the way the speaker feels about the disclosed event. One explanation is that social disclosure simply induced a change in mood, therefore influencing the emotional intensity ratings made immediately afterwards. We think this unlikely. Pre-existing dispositional mood is not thought to be a cause of the fading affect bias (Ritchie et al., 2009) and one would expect a global mood change to have bearing on *all* the emotional intensity ratings made, not just the ratings for the events that were socially disclosed. Moreover, if a change in mood were involved, the effects should be transient, whereas the effects of social disclosure with feedback lasted for at least a week. Nevertheless, administering a measure of mood before and after social disclosure in future research would eliminate (or confirm) mood misattribution as a contributing factor.

The FAB is proposed to exist as a result of emotional regulation processes operating on autobiographical memory (Walker & Skowronski, 2009). The current results show that the FAB was enhanced by social disclosure with feedback; this suggests socially disclosing events and receiving verbal feedback from the listener encourages emotional regulation processes in the speaker. Such processes then influence the subjective feelings which are experienced upon recall of events from

autobiographical memory (Gross, 1998). There are several ways in which listener feedback could facilitate emotional regulation of the disclosed events, and different processes may apply to pleasant versus unpleasant events respectively. For instance, sharing pleasant events with a listener could encourage savouring of the positive emotions felt at the time therefore retaining their intensity (Bryant & Veroff, 2007). This account is consistent with the finding in the current research that social disclosure of pleasant events led to an immediate increase in positive emotional intensity, regardless of receiving listener feedback or not. Expressions of support provided by a listener during disclosure of an unpleasant experience could reduce stress (Lepore et al., 1993) reassure speakers (Zech & Rime, 2005) or bolster the speaker's own feelings of self-esteem and self-efficacy (Goldsmith, 2004). Speakers are then better able to mobilise their own internal resources to deal with the negative consequences of an unpleasant event (Taylor, 1991). Listener feedback could also prompt the speaker to cognitively re-appraise an unpleasant event as being of lower significance, or reappraise their own ability to deal with the event's consequences, thus reducing the negative emotional impact of the experience (Christophe & Rime, 1997).

Potentially, the changes in percentages of emotion terms in written descriptions immediately after social disclosure could be illustrative of the mechanisms by which listener behaviour influenced emotional intensity. Firstly, if event descriptions are taken to be representative of memory for the event, the results suggest receiving feedback during social disclosure resulted in greater emotion in the event memory, and vice versa where feedback was not received. Participants disclosing to a listener who provided feedback may have focused on the emotional aspects of the event as emotions are perceived as interesting conversational topics (Skowronski & Walker, 2004). In contrast, participants who disclosed to a listener who did not provide feedback were less motivated to talk about the intimate, emotional aspects of the event. Thus, the emotionality of the verbal narrative created during social disclosure influenced the way participants later remembered, and thus described, the socially disclosed events (Pasupathi, 2007). However, this interpretation is complicated by the observation that the emotionality of event descriptions does not always correspond with the direction of change in the emotional intensity ratings. For instance, if event descriptions represent event

memory, increased negative emotion terms in descriptions of unpleasant events socially disclosed with feedback should be associated with a concurrent increase in negative emotional intensity. However, unpleasant events socially disclosed with feedback showed a decrease in emotional intensity (Figure 1b). Further, the effects of social disclosure and listener behaviour upon description emotionality were not evident one week after the experimental manipulations. This suggests if there were any changes to memory, such changes were not long lasting.

Alternatively, findings from the written emotional disclosure literature suggest increased emotional expression is indicative of emotional processing of the event. Emotional processing involves emotional expression, cognitive changes and a conversion from negative to positive feelings (Nichols & Efran, 1985), and so could be involved in enhancing positive and minimising negative emotional intensity. Receiving feedback during social disclosure could have encouraged participants to begin emotionally processing the socially disclosed events, as evidenced by the increased percentages of emotion terms in their written descriptions. This enhanced emotional processing could therefore underlie the immediate increases in positive and decreases in negative emotional intensity observed after social disclosure with feedback. This is consistent with findings from emotional disclosure studies which show increased use of positive and negative emotion terms in written and verbal narratives is associated with improved physical and psychological health and behavioural changes after disclosure (Murray & Segal, 1994; Pennebaker & Chung, 2011). Further, research has found that only a short burst of emotional expression is needed to encourage emotional processing of events and show later improvements to health (Burton & King, 2008). This may explain why no changes to the emotional content of descriptions were evident one week after social disclosure; listener feedback encouraged emotional expression as the first stage of processing the events, which one week later had progressed to other changes such as re-appraisal from a negative to a more positive interpretation of an event (i.e., Levine & Bluck, 2004) or integrating the event into their sense of self (Weeks & Pasupathi, 2011). Thus, potentially one of the ways in which listener feedback enhances the FAB is through encouraging speakers to acknowledge and express their emotions, which then facilitates emotional processing and cognitive change (Ullrich & Lutgendorf, 2002).

It is important to note the effects of listener feedback during social disclosure may not necessarily be accounted for by a single underlying mechanism. For instance, listeners may only encourage emotional expression, and thus emotional processing of the disclosed event, if a strong rapport is formed between speaker and listener. In turn, the formation of rapport may be dependent on the listener providing responses perceived by the speaker as emotionally supportive. Further, social disclosure and listener behaviour could potentially influence the FAB through a variety of mechanisms but one may predominate dependent on the valence of the event and other event characteristics, the relationship between the speaker and listener and the disclosing situation. The current study has made the first steps towards understanding why social disclosure is effective in enhancing the FAB, and suggests several new exciting avenues for further research.

Future Directions

The current research was the first in the FAB literature to experimentally manipulate listener behaviour during social disclosure, and as such concentrated on a relatively straightforward manipulation of listener behaviour (i.e., the provision of verbal feedback or not). Future research could extend the current findings by using experimental manipulations designed to further examine specific types of listener responses. For instance, confederates could be trained to behave in either a challenging or empathetic manner in response to social disclosures to unpleasant events (Lepore et al., 2004). Along similar lines, confederates could also be trained to respond in ways which are helpful (expressions of love, concern and understanding) or unhelpful (minimising the seriousness of an event or emphasising negativity; Lehman & Hemphill, 1990), or in ways which validate or reject the speaker's feelings about the event (Harris, Barnier, Sutton & Keil, 2010) to provide further evidence as to specific listener responses which are instrumental in enhancing the FAB. Further research could also involve extending the current paradigm to investigate the effects of disclosure through different mediums, such as written disclosure, social disclosure via computer mediated communication (i.e., social networking sites or webcams), voice only communication (i.e., telephone calls), and disclosure using technology (i.e., text message or email) compared to face-to face social disclosure. An additional interesting avenue for future research could be in exploring patterns in non-verbal gestures

(such as smiling, nodding, facial expressions and so on) and gaze that are characteristic of an enhanced FAB after social disclosure.

Finally, the replication of the FAB in the current study adds to previous work indicating the FAB is a genuine effect of interest and unlikely to exist purely as a result of methodological artefact (i.e., Ritchie et al., 2006, 2009). Future research would benefit from adopting alternative methods in order to continue this work in validating the existence of the FAB. The use of experience sampling techniques in addition to daily dairies and retrospective recall methods to gather event memories would limit selection bias in the collection of autobiographical memories. Additionally, the use of bipolar rating scales (i.e., a scale which runs from negative emotion at one end of the scale through to positive at the other) instead of unipolar scales to collect self-report emotional intensity ratings enables detection of instances where events flip emotional valence from negative to positive or vice versa (i.e., Ritchie et al., 2009). It would be informative to see if any such switches in emotional valence occur as a result of social disclosure. For instance, switches in emotional valence from negative to positive could potentially be indicative of cognitive re-appraisal processes encouraged by listener feedback. These may facilitate positive reframing of negative events, thus changing emotional responses to the event (i.e., Levine & Bluck, 2004). Such extensions to the FAB paradigm would support the robustness and reliability of the FAB, by providing evidence of convergent validity.

Conclusions

In summary, the present study found novel evidence that the effects of social disclosure in the fading affect bias cannot be accounted for by verbalisation of the memory alone. Not only is a listener required, but the behaviour of the listener during social disclosure is important in determining how much emotional intensity changes for both pleasant and unpleasant events. This study also demonstrates the first linguistic analysis of event descriptions in the fading affect bias literature. We found that the effects of social disclosure and listener behaviour not only influenced self-reported emotional intensity, but the extent of emotional expression in subsequent event descriptions. These effects were only temporary, evident only in the event descriptions written immediately after social disclosure. However, this initial research shows that examining the linguistic characteristics of

written event descriptions could have the potential to provide a useful additional dimension to research into the FAB phenomenon. Future research should aim to further investigate the parameters and timescale of the effects of social disclosure upon emotional expression, and the mechanisms by which listener behaviour, verbal feedback, and emotional expression interact to influence the speaker's feelings for the disclosed event. This research area is rich with possibilities for future research with further manipulations of listener behaviour and analysis of verbal and non-verbal interaction, individual differences, social context, and social norms all potential avenues of investigation. A consideration of all these aspects may provide insight into the circumstances in which talking does make you feel better - and when it can actually make you feel worse.

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References

Berkhof, J. & Kampen, J. K. (2004). Asymptotic Effect of Misspecification in the Random Part of the Multilevel Model. *Journal of Educational and Behavioral Statistics, 29* (2), 201-218.

Burton, C. M., & King, L. A. (2004). The health benefits of writing about intensely positive experiences. *Journal of Research in Personality, 38*, 150-163.

Bryant, F. B. & Veroff, J. (2007). *Savoring: A new model of positive experience*. Mahwah, NJ: Lawrence Erlbaum Associates Publishers; US.

Christophe, V. & Rime, B. (1997). Exposure to the social sharing of emotion: Emotional impact, listener responses and secondary social sharing. *European Journal of Social Psychology, 27* (1), 37-54.

Conway, M. A. & Pleydell-Pearce, C. W. (2000). The construction of autobiographical memories in the self-memory system. *Psychological Review, 107* (2), 261-288.

Dwyer, J., Gibbons, J. A. & Walker, W. R. (2004). *The fading affect bias is not driven by participants beliefs*. Unpublished manuscript. Winston-Salem State University. IL.

Echterhoff, G., Higgins, E. & Groll, S. (2005). Audience-tuning effects on memory: The role of shared reality. *Journal of Personality and Social Psychology, 89* (3), 257-276.

Ford, J. H., Addis, D. R. & Giovanello, K. S. (2012). Differential effects of arousal in positive and negative autobiographical memories. *Memory, 20* (7), 771 – 778.

Frattaroli, J. (2006). Experimental disclosure and its moderators: A meta-analysis. *Psychological Bulletin, 132*, 823 - 865.

Gibbons, J. A., Lee, S. A. & Walker, W. R. (2011). The fading affect bias begins within 12 hours and persists for 3 months. *Applied Cognitive Psychology, 25* (4), 663 - 672.

Goldsmith, D. J. (2004). *Communicating social support*. New York, NY: Cambridge University Press; US.

Goldstein, H. (2003). *Multilevel Statistical Models*. London: Arnold Publishers.

Gross, J. J. (1998). The emerging field of emotion regulation: An integrative review. *Review of General Psychology, 2* (3), 271-299

Hamilton-West, K. E. & Quine, L. (2007). Effects of written emotional disclosure on health outcomes in patients with ankylosing spondylitis. *Psychology & Health, 22* (6), 637-657.

Harris, C. B., Barnier, A. J., Sutton, J. & Keil, P. G. (2010). How did you feel when 'The Crocodile Hunter' died? Voicing and silencing in conversation influences memory for an autobiographical event. *Memory, 18* (2), 185 - 197.

Higgins, E. & Rholes, W. S. (1978). "Saying is believing": Effects of message modification on memory and liking for the person described. *Journal of Experimental Social Psychology, 14* (4), 363-378.

Krauss, R. M. & Fussell, S. R. (1991). Perspective-taking in communication: Representations of others' knowledge in reference. *Social Cognition, 9* (1), 2-24.

Kraut, R. E., Lewis, S. H. & Swezey, L. W. (1982). Listener responsiveness and the coordination of conversation. *Journal of Personality and Social Psychology, 43* (4), 718-731.

Landau, J. D. & Gunter, B. C. (2009). "Don't worry, you really will get over it": Methodological investigations of the fading affect bias. *American Journal of Psychology, 122* (2), 209 - 217.

Lehman, D. R. & Hemphill, K. J. (1990). Recipients' perceptions of support attempts and attributions for support attempts that fail. *Journal of Social and Personal Relationships, 7* (4), 563-574.

Lepore, S. J., Allen, K. M. & Evans, G. W. (1993). Social support lowers cardiovascular reactivity to an acute stressor. *Psychosomatic Medicine, 55* (6), 518-524

Lepore, S. J., Fernandez-Berrocal, P., Ragan, J. & Ramos, N. (2004). It's not that bad: Social challenges to emotional disclosure enhance adjustment to stress. *Anxiety, Stress & Coping: An International Journal, 17* (4), 341-361.

Levine, L. J. & Bluck, S. (2004). How Emotions Fade: Valence, Appraisals, and the Emotional Impact of Remembered Events. In S. P. Shohov (Ed.), *Advances in Psychology Research* (Vol. 30, pp. 3 - 20). Hauppauge, NY: Nova Science Publishers; US.

Mundfrom, D. J., Perrett, J. J., Schaffer, J., Piccone, A. & Roozeboom, M. (2006). Bonferroni adjustments in Tests for Regression Coefficients. *Multiple Linear Regression Viewpoints, 32* (1), 1 - 6.

Murray, E. J. & Segal, D. L. (1994). Emotional processing in vocal and written expression of feelings about traumatic experiences. *Journal of Traumatic Stress, 7* (3), 391-405.

Nichols, M. P. & Efran, J. S. (1985). Catharsis in psychotherapy: A new perspective. *Psychotherapy*, *22*, 46 – 58.

Pasupathi, M. (2001). The social construction of the personal past and its implications for adult development. *Psychological Bulletin, 127* (5), 651-672.

Pasupathi, M. (2003). Emotion regulation during social remembering: Differences between emotions elicited during an event and emotions elicited when talking about it. *Memory, 11* (2), 151-163.

Pasupathi, M. (2007). Telling and the remembered self: Linguistic differences in memories for previously disclosed and previously undisclosed events. *Memory, 15* (3), 258 - 270.

Pasupathi, M. & Hoyt, T. (2010). Silence and the shaping of memory: How distracted listeners affect speakers' subsequent recall of a computer game experience. *Memory, 18* (2), 159 - 169.

Pennebaker, J. W. (1993). Putting stress into words: Health, linguistic, and therapeutic implications. *Behaviour Research and Therapy, 31* (6), 539-548

Pennebaker, J. W. (1997). Writing about emotional experiences as a therapeutic process. *Psychological Science, 8* (3), 162-166.

Pennebaker, J. W. & Beall, S. K. (1986). Confronting a traumatic event: Toward an understanding of inhibition and disease. *Journal of Abnormal Psychology, 95* (274 - 281).

Pennebaker, J. W., Booth, R. J. & Francis, M. E. (2007). LIWC 2007: Linguistic Inquiry and Word Count (Version 1.08). Austin, Texas: liwc.net.

Pennebaker, J. W. & Chung, C. K. (2011). *Expressive writing: Connections to physical and mental health*. In H. S. Friedman (Ed.) Oxford Handbook of Health Psychology (pp. 417 – 437). New York, NY: Oxford University Press.

Pennebaker, J. W., Chung, C. K., Ireland, M., Gonzales, A. & Booth, R. J. (2007). The development and psychometric properties of LIWC 2007. Retrieved September 2013, from www.liwc.net

Pennebaker, J. W. & Francis, M. E. (1996). Cognitive, emotional, and language processes in disclosure. *Cognition and Emotion, 10* (6), 601-626.

Pennebaker, J. W., Mehl, M. R. & Niederhoffer, K. G. (2003). Psychological aspects of natural language use: Our words, our selves. *Annual Review of Psychology, 54*, 547-577.

Pennebaker, J. W., Mayne, T. J. & Francis, M. E. (1997). Linguistic predictors of adaptive bereavement. *Journal of Personality and Social Psychology, 72* (4), 863-871.

Rasbash, J., Browne, W., Healy, M., Cameron, B. & Charlton, C. (2010). MLwiN (Version 2.2): Bristol, UK: Centre for Multilevel Modelling, University of Bristol.

Rasbash, J., Steele, F., Browne, W. J., & Goldstein, H. (2009). A user's guide to MLwiN, v. 2.10. Bristol: Centre for Multilevel Modelling, University of Bristol.

Rime, B., Mesquita, B., Philippot, P. & Boca, S. (1991). Beyond the emotional event: Six studies on the social sharing of emotion. *Cognition & Emotion, 5* (5-6), 435-465.

Ritchie, T. D. & Skowronski, J. J. (2008). Perceived change in the affect associated with dreams: The fading affect bias and its moderators. *Dreaming, 18* (1), 27-43.

Ritchie, T. D., Skowronski, J. J., Hartnett, J., Wells, B. & Walker, W. R. (2009). The fading affect bias in the context of emotion activation level, mood, and personal theories of emotion change. *Memory, 17* (4), 428 - 444.

Ritchie, T. D., Skowronski, J. J., Wood, S. E., Walker, W. R., Vogl, R. J. & Gibbons, J. A. (2006). Event Self-importance, Event Rehearsal, and the Fading Affect Bias in Autobiographical Memory. *Self and Identity, 5* (2), 172-195.

Schwartz, L. & Drotar, D. (2004). Linguistic analysis of written narratives of caregivers of children and adolescents with chronic illness: Cognitive and emotional processes and physical and psychological health outcomes. *Journal of Clinical Psychology in Medical Settings, 11* (4), 291-301.

Schwartz, S. L. & Wright, D. B (2012). Memory conformity for New and Old Items with Immediate and Delayed Testing. *Applied Cognitive Psychology, 26* (4), 508 – 515.

Sedikides, C., Skowronski, J. J. & Gaertner, L. (2004). Self-enhancement and Self-protection Motivation: From the Laboratory to an Evolutionary Context. *Journal of Cultural and Evolutionary Psychology, 2*, 61 – 79

Skagerberg, E. M. & Wright, D. B. (2008). Manipulating Power can Affect Memory Conformity. *Applied Cognitive Psychology, 22*, 207 – 216.

Skagerberg, E. M. & Wright, D. B. (2009). Sibling differentials in power and memory conformity. *Scandinavian Journal of Psychology, 50*, 101 – 107.

Skowronski, J. J., Gibbons, J. A., Vogl, R. J. & Walker, W. R. (2004). The effect of social disclosure on the intensity of affect provoked by autobiographical memories. *Self and Identity, 3* (4), 285-309.

Skowronski, J. J. & Walker, W. R. (2004). How describing autobiographical events can affect autobiographical memories. *Social Cognition, 22* (5), 555-590.

Tausczik, Y. R. & Pennebaker, J. W. (2010). The Psychological Meaning of Words: LIWC and Computerised Text Analysis Methods. *Journal of Language and Social Psychology, 29* (1), 24 - 54.

Taylor, S. E. (1991). Asymmetrical effects of positive and negative events: The mobilization-minimization hypothesis. *Psychological Bulletin, 110*, 67 - 85.

Ullrich, P.A. & Lutgendorf, S.L. (2002). Journaling about stressful events: Effects of cognitive processing and emotional expression. *Annals of Behavioral Medicine, 24*, 244 - 250.

Walker, W. R., Skowronski, J. J., Gibbons, J. A., Vogl, R. J. & Ritchie, T. D. (2009). Why people rehearse their memories: Frequency of use and relations to the intensity of emotions associated with autobiographical memories. *Memory, 17* (7), 760 - 773.

Walker, W. R., Skowronski, J. J., Gibbons, J. A., Vogl, R. J. & Thompson, C. P. (2003). On the emotions that accompany autobiographical memories: Dysphoria disrupts the fading affect bias. *Cognition & Emotion, 17* (5), 703-723.

Walker, W. R. & Skowronski, J. J. (2009). The Fading affect bias: But what the hell is it for? *Applied Cognitive Psychology, 23* (8), 1122-1136.

Walker, W. R., Skowronski, J. J. & Thompson, C. P. (2003). Life Is Pleasant - and Memory Helps to Keep It That Way! *Review of General Psychology 7*(2), 203 - 210.

Walker, W. R., Vogl, R. J. & Thompson, C. P. (1997). Autobiographical memory: Unpleasantness fades faster than pleasantness over time. *Applied Cognitive Psychology, 11* (5), 399-413.

Weeks, T. L. & Pasupathi, M. (2011). Stability and Change Self-Integration for Negative Events: The Role of Listener Responsiveness and Elaboration. *Journal of Personality, 79* (3), 469-498.

Wright, D. B. (1998). Modelling Clustered Data in Autobiographical Memory Research: The Multilevel Approach. *Applied Cognitive Psychology, 12*, 339 - 357.

Zech, E. & Rime, B. (2005). Is talking about an emotional experience helpful? Effects on emotional recovery and perceived benefits. *Clinical Psychology & Psychotherapy, 12* (4), 270-287.

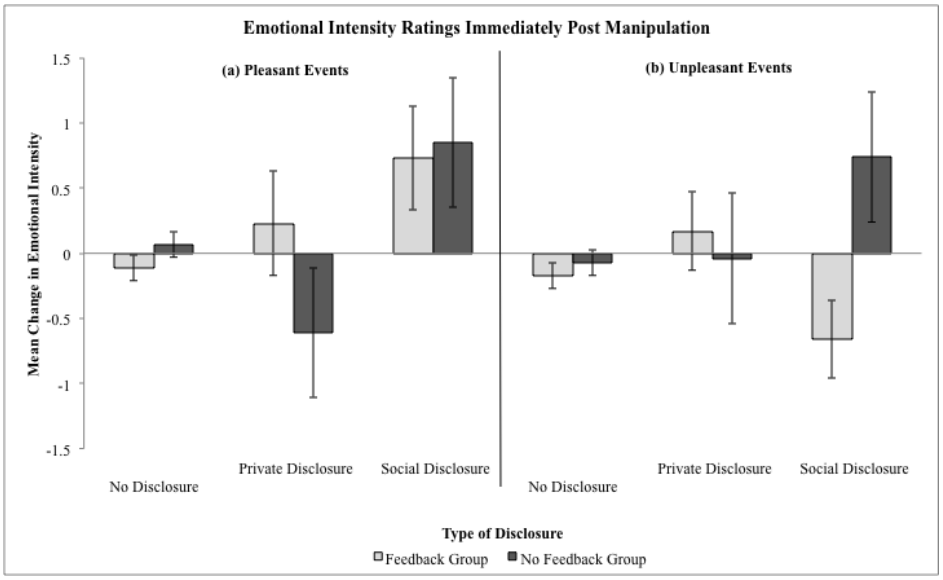

Figure 1: Mean change in emotional intensity immediately post manipulation, as a function of event valence, type of disclosure and listener behaviour. Positive scores indicate increases in emotional intensity and negative scores indicate decreases in emotional intensity. Error bars represent +/- one standard deviation from the mean.

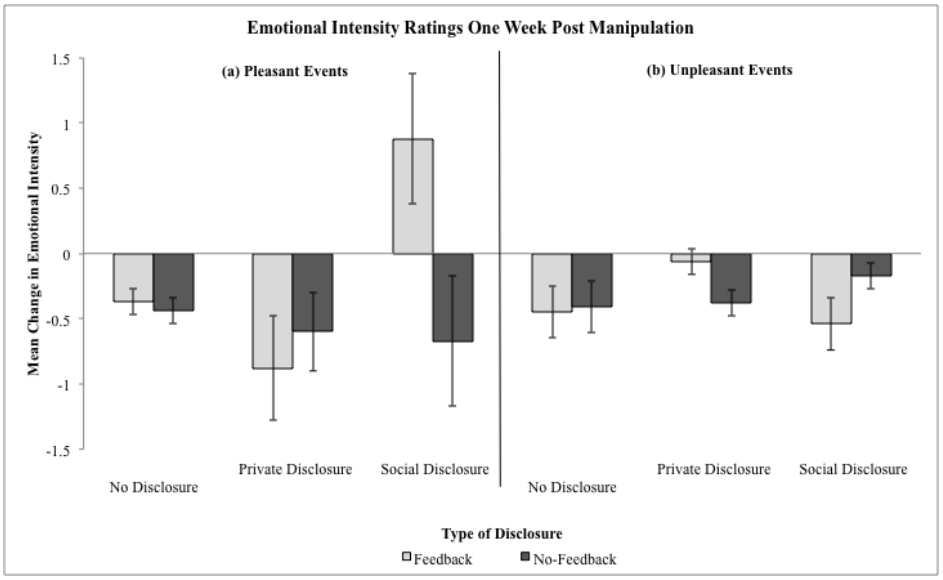

Figure 2: Mean change in emotional intensity one week post manipulation, as a function of event valence, type of disclosure and listener behaviour. Positive scores indicate increases in emotional intensity and negative scores indicate decreases in emotional intensity. Error bars represent +/- one standard deviation from the mean.

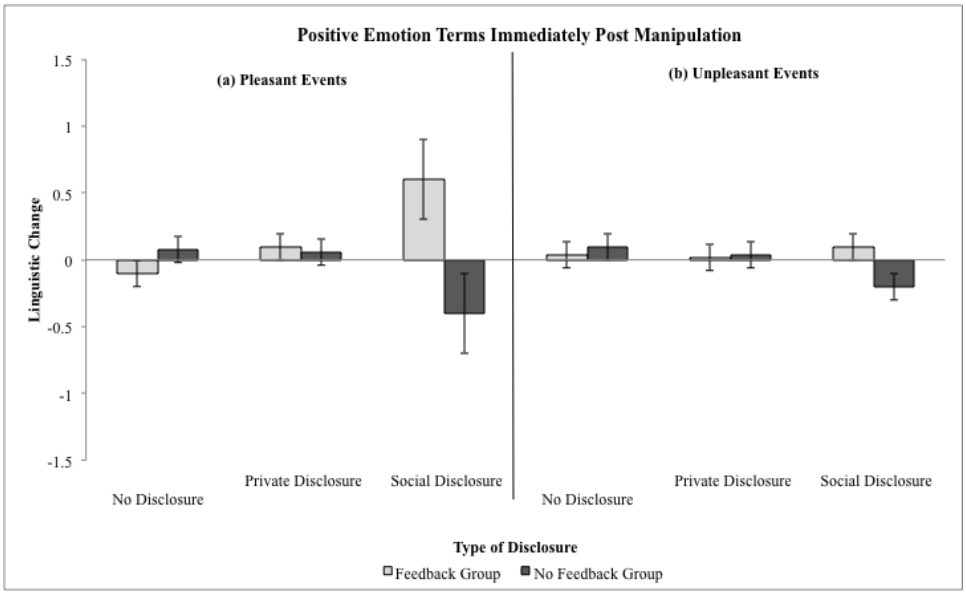

Figure 3: Linguistic change for positive emotion terms immediately post manipulation, as a function of event valence, type of disclosure and listener behaviour. Positive scores indicate increase in percentage of emotion terms in descriptions and negative scores indicate decreases. Error bars represent +/- one standard deviation from the mean.

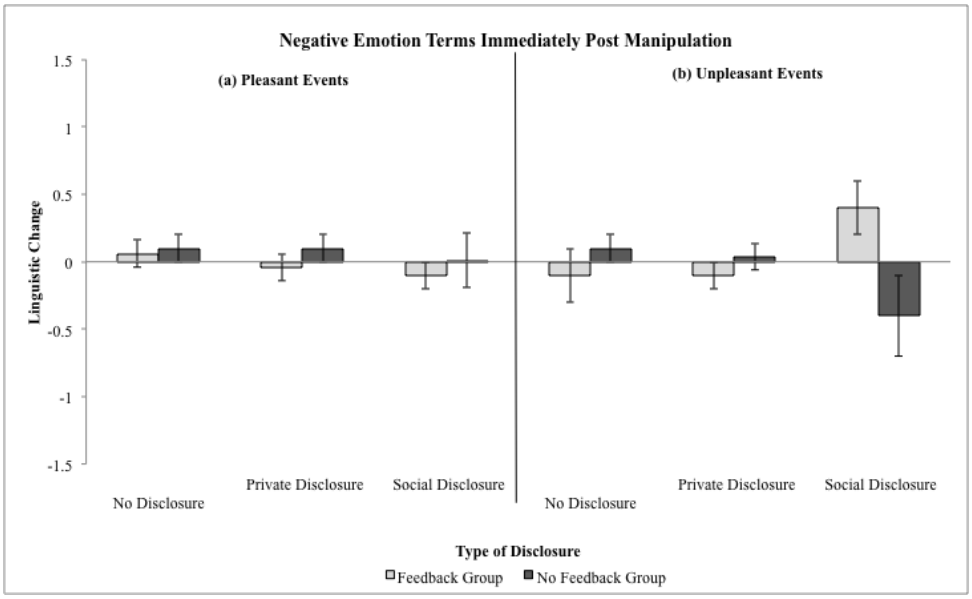

Figure 4: Linguistic change for negative emotion terms immediately post manipulation, as a function of event valence, type of disclosure and listener behaviour. Positive scores indicate

increase in percentage of emotion terms in descriptions and negative scores indicate decreases. Error bars represent +/- one standard deviation from the mean.